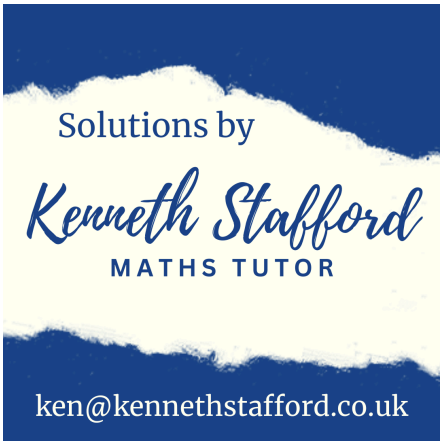
Name: SOLUTIONS

GCSE (1 - 9)

Indices (Index Laws)





These questions are compiled from *released* Pearson Edexcel GCSE maths exam papers
They contain exam questions from up until the ***Summer 2023*** exam series
More recent exam papers do exist but are withheld for mock exams
As new exam papers are released these worksheets will gradually be updated
The ***most current*** version of these worksheets will always be available at: kennethstafford.co.uk

Question	Where the question appeared
1	Edexcel, GCSE, Autumn 2017, Paper 1F, Q22
2	Edexcel, GCSE, Autumn 2017, Paper 2F, Q21
3	Edexcel, GCSE, Summer 2018, Paper 2F, Q20
4	Edexcel, GCSE, Autumn 2018, Paper 1F, Q20
5	Edexcel, GCSE, Autumn 2019, Paper 1F, Q26
6	Edexcel, GCSE, Autumn 2020, Paper 1F, Q30
7	Edexcel, GCSE, Autumn 2020, Paper 3F, Q23
8	Edexcel, GCSE, Summer 2023, Paper 1F, Q29
9	Edexcel, GCSE, Summer 2023, Paper 3F, Q20
10	Edexcel, GCSE, November 2022, Paper 1F, Q21

1

(a) Work out $\frac{2}{5} + \frac{1}{4}$ $= \frac{2\times4}{20} + \frac{1\times5}{20} = \frac{8}{20} + \frac{5}{20} = \frac{13}{20}$

$\frac{13}{20}$

(2)

(b) Write down the value of 2^{-3}

$2^{-3} = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$ $\frac{1}{8}$

(1)

(Total for Question 22 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 1F, Q22]

2

$p^3 \times p^x = p^9$

(a) Find the value of x.

$3 + x = 9$

$x = 6$

$x =$ 6

(1)

$(7^2)^y = 7^{10}$

(b) Find the value of y.

$2y = 10$

$y = \frac{10}{2} = 5$

$y =$ 5

(1)

$100^a \times 1000^b$ can be written in the form 10^w

(c) Show that $w = 2a + 3b$

$100^a = (10^2)^a = 10^{2a}$

$1000^b = (10^3)^b = 10^{3b}$

$10^w = 100^a \times 1000^b$

$10^w = 10^{2a} \times 10^{3b}$

$10^w = 10^{2a+3b}$

$w = 2a + 3b$

(2)

(Total for Question 21 is 4 marks)

[Edexcel, GCSE, Autumn 2017, Paper 2F, Q21]

3

(a) Simplify $m^3 \times m^4$

$3 + 4 = 7$

m^7

(1)

(b) Simplify $(5np^3)^3$

$(5np^3)^3 = (5)^3 \times (n)^3 \times (p^3)^3 = 125n^3p^9$

$125n^3p^9$

(2)

(c) Simplify $\frac{32q^9r^4}{4q^3r}$

$= \frac{32}{4} \times \frac{q^9}{q^3} \times \frac{r^4}{r^1}$

$= 8 \times q^6 \times r^3$

$8q^6r^3$

(2)

(Total for Question 20 is 5 marks)

[Edexcel, GCSE, Summer 2018, Paper 2F, Q20]

4

Work out the value of $\frac{3^7 \times 3^{-2}}{3^3}$

$= \frac{3^{7+-2}}{3^3} = \frac{3^5}{3^3} = 3^{5-2} = 3^3$

3^3

(Total for Question 20 is 2 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1F, Q20]

5

(a) Simplify $(p^2)^5$

$2 \times 5 = 10$

p^{10}

(1)

(b) Simplify $12x^7y^3 \div 6x^3y$

$\frac{12}{6} \times \frac{x^7}{x^3} \times \frac{y^3}{y}$

$2 \times x^4 \times y^2$

$2x^4y^2$

(2)

(Total for Question 26 is 3 marks)

[Edexcel, GCSE, Autumn 2019, Paper 1F, Q26]

6

(a) Make q the subject of $p = 6q + 7$

$6q + 7 = p$

$6q = p - 7$

$q = \frac{p-7}{6}$

(2)

(b) Simplify $(m^{-2})^{-3}$

$-2 \times -3 = +6$

m^6

(1)

(Total for Question 30 is 3 marks)

[Edexcel, GCSE, Autumn 2020, Paper 1F, Q30]

7

(a) Simplify $n^3 \times n^5$

$3 + 5 = 8$

n^8

(1)

(b) Simplify $\frac{c^3d^4}{c^2d}$

$\frac{c^3}{c^2} \times \frac{d^4}{d^1}$

$c \times d^3$

cd^3

(2)

(c) Solve $\frac{5x}{2} > 7$

$\frac{5x}{2} > 7$

$5x > 14$

$x > \frac{14}{5}$

$x > 2 \cdot 8$

(2)

(Total for Question 23 is 5 marks)

[Edexcel, GCSE, Autumn 2020, Paper 3F, Q23]

8

Work out the value of $\dfrac{4^{-6} \times 4^{9}}{4}$

$\dfrac{4^{3}}{4^{1}} = 4^{2}$

.....

(Total for Question 29 is 2 marks)

[Edexcel, GCSE, Summer 2023, Paper 1F, Q29]

9

(a) Simplify $(m^2)^3$

$2 \times 3 = 6$

m^6

.....

(1)

(b) Simplify $x^5 \times x^8$

$5 + 8 = 13$

x^{13}

.....

(1)

(c) Expand $4p(p^2 + 3p)$

$4p^3 + 12p^2$

.....

(2)

(Total for Question 20 is 4 marks)

[Edexcel, GCSE, Summer 2023, Paper 3F, Q20]

10

Simplify $(2^{-5} \times 2^8)^2$

Give your answer as a power of 2

$(2^3)^2 = 2^6$

.....

(Total for Question 21 is 2 marks)

[Edexcel, GCSE, November 2022, Paper 1F, Q21]